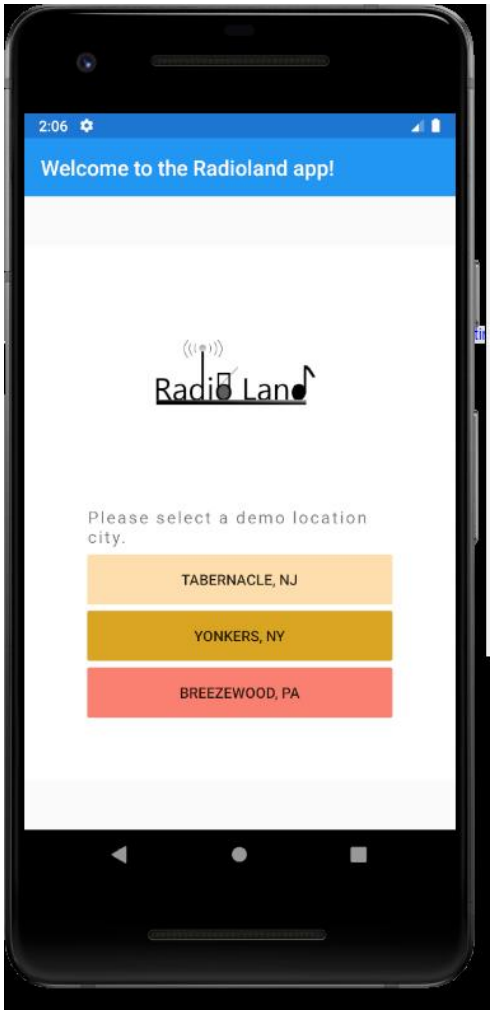
VISION AND SCOPE DOCUMENT
FOR
RADIOLAND APP



VERSION 1.0 APPROVED
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NJL RADIO RESEARCH
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Revision History

Name	Date	Reason For Changes	Version

Business Requirements

Background

Our client base satisfaction rate for the services that NJL Radio Research provides is typically quite high. We maintain the fullest and most accurate database of FM radio stations in North America. Clients ranging from industry engineers to marketing professionals to hobbyists have come to rely on our data to stay up to date on radio station format changes, coverage patterns of radio stations, and transmitter location coordinates. Since NJL Radio Research was founded in 2002, our #1 request from our customers has been a way to easily access our database while traveling. Different concepts were considered, including a web-based search (analogous to that of radio-locator.com), but it is clear to us that within the last 10 years, information in an "on the go" capacity has moved to mobile platforms. Our research, conducted with in-depth studies, including three separate focus groups consisting of participants all within the radio industry or in radio-related capacities, showed strong support for a mobile app that can generate listings and map illustrations of nearby radio stations, along with search functionality. With that, we introduce RadioLand.

Business Opportunity

For NJL Radio Research, the main opportunity RadioLand presents is the ability for us to offer a flagship mobile app that the public can easily access. Before RadioLand, our database was only available to private clients who worked with us directly. This setup works well for our existing clients, who can perform as many queries to the database as they need freely. Yet, we foresee a large potential for growth with additional features introduced that are powered by the database. Radio station coverage maps appearing via an aesthetically-pleasing mapping API, or an optimized search engine to produce a listing of clear signaled radio stations from a given location in under 5 seconds, are some of the ways RadioLand can distinguish itself as the choice app for those desiring information on North American FM radio stations.

As far as the market appetite for a radio station locator type app, there are several apps in the iOS and Google Play app stores that purported such functionality but are now essentially orphaned, no longer maintained. These apps all appeared to be side or hobby projects as opposed to business-focused. However, NJL Radio Research did account for their downfalls in our research leading up to this project. There is a giant void as far as a mobile application offering on-the-go FM radio search functionality. The clear competition for such services would be radio-locator.com, a long-standing website originally developed as the MIT list of radio stations on the internet. Radio-Locator has a positive reputation across the industry and some of its features will certainly be emulated in this endeavor. However, its web-based interface lends itself to be somewhat cumbersome while operating on a mobile device. It also has a very sharp price tier (with roughly about 10 free searches a day before having to pay a membership rate to continue searching). RadioLand will also feature a price tier, but one we believe will be much more affordable in the marketplace.

Of course, there are dozens, if not hundreds, of streaming-based radio apps on iOS and Android, that feature live streams from both "terrestrial" radio stations and online-only radio stations. While RadioLand may eventually feature links to access radio station streams, RadioLand is very clear in its mission to deliver listings of over-the-air FM radio stations. This is not an app for streaming. This makes us very different in a very competitive marketplace.

Business Objectives

NJL Radio Research has projected several milestones stemming from the launch of the RadioLand app. These projections are based on the study of the success of apps in related industries, including sports media. NJL Radio Research's projection is to have the RadioLand app live in the iOS and Android app stores by December 2021.

- 300,000 app downloads on both the Android and iOS stores by December 2022.
- An 85% adoption rate of the app (in the form of paid accounts) by our existing customers.
- 7,500 paid users by Q4 2022.
- $150,000 worth of increased revenue to NJL Radio Research by the end of Q4 2022.
- $400,000 worth of additional revenue by Q4 2023.
- $80,000 worth of savings per year based on man-hours and overhead maintaining existing on-demand/ala carte database management.

Success Metrics

While NJL Radio Research strives to meet all our projected deliverable dates as far as deployment of the RadioLand app on iOS and Android, our primary focus for success is the app achieving our performance benchmarks. Those benchmarks include:

- Using an example of a highly congested FM radio dial, that the app will be performing well enough to produce a listing of the New York City FM radio dial via a text listing within 6 seconds, and on our mapping API (with coverage maps) within 10 seconds, on a typical 4G LTE cellular connection.
- 100% of our database will be accessible within the app. If the radio station is licensed in North America and has proper coordinates, the station should be searchable and come up in listings queried by the user.
- At least 75% satisfaction rate of the app (based on surveys NJL Radio Research plans to conduct during Q2 and Q3 2022).

NJL Radio Research will pay particularly close attention to ratings of the RadioLand app in the iOS and Google Play app stores. While app reviews can sway rapidly, particularly in cases of small sample sizes, we respect the process and understand that app reviews are ultimately the easiest way for customers to voice their pleasure (or displeasure) concerning an app. An average rating of 4.0 (four stars) is our minimum acceptable benchmark on each platform.

Vision Statement

For our customers ranging from industry professionals to hobbyists to travelers who need access to updated listings of FM radio stations across North America, RadioLand is the singular premiere mobile app that will provide location-based results for FM radio stations in both listing and map form. Powered by a database of over 10,000 FM radio stations across the United States, Canada, and Mexico, the listings that are produced by our algorithm will be more accurate than any existing radio location listing infrastructure. Our sleek mapping API will be aesthetically pleasing, yet the technical detail within our listings will meet the standard of engineers and industry personnel.

Unlike other apps that have existed on Apple iOS and Android, RadioLand will be consistently updated with the latest format and callsign changes from our database, along with any technical details.

Business Risks

With any business opportunity comes risk. Based on our research, here are the risks we foresee that could hamper implementation and market traction of the RadioLand product:

- **Is radio still relevant?** **Medium** This is a question none of us wishes to contemplate fully. According to a Nielsen study in 2019, 93% of U.S. adults still listen to the radio (as in over-the-air and not streaming) today. That said, the trend toward streaming, podcasting, and other audio mediums cannot be denied. Overestimating the potential interest of an app showcasing a platform that no longer has the same relevance and reach could impact the NJL growth and revenue estimates. A mitigation strategy we have considered includes marketing the app to niche groups (such as hobbyists) that are less likely to lose interest in radio-related products.
- **Map API-licensing fees** **Medium** In 2018, Google Maps largely increased the cost of using its API, outside of small use cases, such as for a hobby project. Our research is still ongoing as to the best choice for a map API for our station coverage maps. A higher cost than anticipated for API licensing could impact growth and revenue estimates. One mitigation strategy being discussed is to use the OpenMaps API, which is collected free of cost. However, this API may be far less versatile and attractive.
- **Pandemic impact on traveling** **High** If RadioLand had been slated to be released in the 2020 calendar year, its release would likely have been pushed back due to pandemic impacts. Right now, it is impossible to project how traveling will look by the end of 2021. If COVID-19 vaccines are successful, there may even be a traveling boom. If infections persist and the economy continues to lag, it is hard to envision high interest on the part of traveling consumers looking for a radio listing app. Our mitigation strategy is, for now, to focus on converting our existing customer base, as well as hobbyists, to the app, where there would be less risk of impact from the ongoing pandemic.

Business Assumptions and Dependencies

Business Assumptions

- Our projection of 300,000 app downloads by Dec. 2022 and $150,000 worth of increased revenue by Q4 2022 are based on expected economic recovery from the effects of the COVID-19 pandemic and flat-growth by the radio industry during that time.
- Our projection of $80,000 worth of savings per year after app deployment is based on the assumption that 85% of our current client base will adopt the RadioLand app.

Dependencies

- Third-party vendor: Mapping API (still to be determined)
- Third-party vendor: Database host (Our preference is to use Google Firebase)
- Our sources for radio station format changes: We typically use a variety of sources but also rely on crowdsourced reports from listeners

Scope and Limitations

Major Features

1. **GPS-location-based listings:** After obtaining permission from the user to use their current GPS-based location on their mobile device, the application shall generate a list of the 'comfortably receivable' FM radio stations from their current location. The list shall include the station's call letters, frequency, city of license, state or province, and their current programming format. The list shall also have an indicator of the quality of signal strength to expect at the given location based on a graphic of 4 bars (4 – excellent, 3 – good, 2 – average, 1 – poor).
2. **Adjustable predictive algorithm for listings:** The user shall be able to tweak the threshold of what is shown as 'comfortably receivable' in listings, which adjusts the algorithm which predicts the radio stations that are receivable at a given location, based on the power and antenna height of the transmitting radio station, and the average terrain that is between the station's transmitter and the location of the user. If the user wishes to include stations that may be 'fringe' quality or filled with static, possibly for DX or hobby purposes, they shall adjust the threshold lower via a slider.
3. **GPS-location map-based plot of radio stations:** In addition to listings, the user shall have the ability, through an on-screen drop-down selector, to change to a map-based view. The map shall plot the user's current location and show the locations of the nearest radio stations to them with plots for their transmitter location on the map.
4. **Adjustable predictive algorithm for map-based view:** The user shall be able to change the threshold for which stations show on the map (within a mileage radius or 'comfortable reception' threshold).
5. **Search-based listings for any North American location:** The user shall be able to search for any North American location, based on either its city and state or province or by its coordinates in latitude and longitude, to generate a listing of the predicted 'comfortably receivable' radio stations at the given location. The search results shall be produced in either a list or in map-based form.
6. **Live connection to NJL Radio Research North American FM database:** All listings shall be produced from a connection to the NJL Radio Research North American FM database, through its provider Google Firebase. Accounting for a typical 4G LTE cellular connection in the United States and Canada, any search query shall produce results in no less than 10 seconds on a map, and no less than 6 seconds in listing form. The database is updated weekly with the latest FM station call letter, frequency, and format changes, and new station sign-ons.
7. **Offline mode:** The user shall have the ability to toggle RadioLand into 'offline mode', which caches 10MB of the FM database on the local device, based on a 100 mi. radius from the user's last-known GPS location.
8. **Tiered access levels:** All users shall conduct 15 "free" searches per 24- hour period on the RadioLand app. RadioLand "Pro" users shall conduct unlimited searches.

Scope of Initial Release

In our initial release, slated for December 2021, we will emphasize the features that are the backbone of RadioLand's functionality, as proof of concept. The **GPS-location-based listings** shall be included, to demonstrate one of the core user stories of the app, for a traveler(s) in an unfamiliar area looking for radio stations to listen to that feature a particular music genre or spoken-word format.

The **search-based listings for any North American location** shall also be included, to demonstrate another core user story, for a radio engineer looking to query the transmitting power and antenna height of a radio

station causing interference to a station(s) they are the chief engineer of. The search-based listings shall demonstrate the vast and complete nature of the NJL Radio Research FM radio database, with all 10,000 FM radio stations available in the initial release associated database. The **live connection to the NJL Radio research North American FM database** will also satisfy the user story for a media-based journalist or researcher, looking to access the most up to date listings of radio stations in a particular market including what their current music genre is, which could be included in a potential report or analysis.

In our initial release, we shall guarantee search queries to be produced in **no more than 20 seconds**, though we feel strongly that this can be greatly improved upon even in the initial release.

Scope of Subsequent Releases

Though not slated for inclusion in any RadioLand release in 2022, the following features are on NJL Radio Research's roadmap and may be considered for future inclusion, depending on factors including user reception of the app and request for features that are alike or similar to the following considerations:

1. **Weather overlay:** As weather conditions can often impact the potential reception of FM radio stations (particularly during conditions favoring tropospheric ducting or enhancement), the map-based view would have an option for a weather overlay produced by a to be determined weather API, which would show precipitation and weather fronts in the given map view.
2. **APRS propagation overlay:** Geared toward the hobbyist use case, an overlay of tropospheric ducting and enhancement paths produced by the Mountainlake VHF APRS system (viewable at http://aprs.mennolink.org/), could be toggled in the map-based view, which would illustrate the potential for tropospheric enhancement at a given location, which could influence FM radio reception.
3. **Tropospheric and sporadic-E propagation alerts:** From the aforementioned APRS system and the DXmaps propagation logs for sporadic-E propagation (http://dxmaps.com/), RadioLand would generate alerts for potential periods of unusual propagation based on the user's current location.
4. **Links to radio station streams and a built-in streaming player:** All radio stations listed in RadioLand that have a publicly accessible online stream would have their stream link included in their listings. The stream could be played directly in RadioLand with a built-in player in the app.
5. **Multi-lingual support:** At this time, the RadioLand app will be available in English-language only. Based on our research, we do not see significant support for listings in other languages. However, with the app listing radio stations in Mexico, Spanish language support will be considered in future releases.

Limitations and Exclusions

1. **Stream links to iHeart, Cumulus, and Entercom-owned radio stations:** RadioLand shall not include any stream links to radio stations affiliated with iHeartMedia, Cumulus, or Entercom, whose stations are streamed exclusively on the iHeartRadio and Radio.com apps respectively.
2. **Unlicensed or internet-only radio stations:** The only radio stations included in RadioLand are those stations licensed in the FCC (United States), CRTC (Canada), and IFT (Mexico). Any unlicensed or "pirate" FM radio stations shall not be included in the app or NJL Radio Research database. Furthermore, any online-only radio stations, regardless of reach or location, shall not be included in the RadioLand app.
3. **Unlimited searches for all users:** RadioLand will employ a tiered-usage system limiting free users to 15 searches per 24-hour period. RadioLand reserves the right to adjust free search limitations based

on usage trends. The price for RadioLand "Pro" access is still to be determined, based on 2021 economic trends.

Business Context

Stakeholder Profiles

Stakeholder	Major Value	Attitudes	Major Interests	Constraints
NJL Radio Research: Executives	*Increase in visibility and revenue*	*Projection of $400,000 worth of additional revenue by Q4 2023.*	*Void in the mobile app market for the scope of the app; Expands reach of company database*	*$800K budgetary limit for development in 2021*
NJL Radio Research: Developers	*Less overhead on DB exports*	*Enthusiastic for the launch of the app; Somewhat fearful of automation replacing their capabilities*	*App will streamline the process of delivering data to users*	*$100K budgetary limit for Firebase database*
Customers: Radio Engineers	*Searching and pulling up station coverage maps in a mobile app*	*Excited for on-demand access to database and maps; "App-fatigue", somewhat reticent toward another app on their phone*	*Predictive coverage maps for radio stations to show where interference can be expected; Search lookup to see technical details of stations*	*Some engineers may need to be trained on use of the app – Not yet budgeted*
Customers: Marketing/Journalists	*Accurate listings of radio stations in cities with correct format and call letters*	*Much excitement for app-based listings versus previous on-demand requests for queries from database*	*Listings of radio stations in major cities for the basis for media coverage of the industry and marketing products to radio stations*	*Non-compete clauses some industry professionals may have to invest in an app*
Customers: Travelers	*Plot nearby stations on a map or in a list relative to their current location on the go*	*Receptiveness in our focus groups; Fills a clear void on mobile platforms*	*Sleek, intuitive method to access the stations they should be able to hear while on a trip in an unfamiliar area*	*Interest – are people still listening to the FM radio?*

Project Priorities

Dimension	***Driver (state objective)***	***Constraint (state limits)***	***Degree of Freedom (state allowable range)***
Schedule	*release 1.0 to be available by 12/1/21 release 1.1 to be available by 3/1/22*	*U.S. and global economy; $800k budgetary limit for development*	*Delivery of version 1.0 can be extended into Q1 2022 based on economic and national health prospects*
Features	*Initial release scope to available in release 1.0 of the app*	*Budgetary ($500k) for mapping API*	*All four (4) features in initial release scope of the eight (8) major features outlined must be included in app*
Quality	*At least 75% satisfaction rate of the app (based on surveys NJL Radio Research plans to conduct during Q2 and Q3 2022).*	*Marketing budget for app limited to $50k for 2022*	*95% of user acceptance tests must pass for release 1.0, 95-98% for release 1.1*
Staff	*Project groupings adhere to the Scrum method principles for ideal productivity*	*Maximum team size is 1 Scrum Master, 1 Product Owner, 1 BA, 6 developers + 3 testers*	*Team size may fluctuate depending on remote work policies during 2021*
Cost	*Stay within projected $800k limit for development in 2021*	*85% conversion rate of existing customers to RadioLand 'Pro'*	*Budget overrun up to 20% acceptable without sponsor review*

Deployment Considerations

For existing customers:

Engineers – Offer multiple training sessions via Zoom during Q1 2022 to acclimate the customers with the app interface upon release of RadioLand v1.0. Survey a selected sample of engineers to gather the most common mobile device platforms and device make and models to account for nuances for app behavior and depiction of app listings and graphics on device. Accentuate the benefits of the accessibility of the app on a mobile device to account for concerns over "app fatigue". Account for the contracts we do have with engineers in both Alaska and Hawaii for app functionality in their respective time zones.

Marketing/Journalists – Planned conversations during March and April 2021 with the four major radio corporations (iHeart, Entercom, Cumulus, Townsquare) to ensure non-compete agreements will not affect the implementation of the app for interested engineers and other station personnel.

Hobbyists/Travelers – Implementation of a warning message if mobile device detects it is being operated in a moving vehicle to prevent operation of the app while driving. Testing stages in five selected areas planned for Q4 2021 to ensure operation of the app in limited cell-signal environments.